

## 4.0 SUMMARY

The USACE implements a yearly monitoring program at F. E. Walter Reservoir to evaluate potential public health and environmental concerns. In general, the monitoring programs emphasize measuring water quality and sediment contamination. Monitoring results are compared to state and federal criteria to evaluate the condition of F. E. Walter Reservoir. The 2004 monitoring program of F. E. Walter Reservoir comprised five major elements:

- Monthly water quality and bacteria monitoring from May through October to evaluate compliance with the Pennsylvania state water quality standards;
- Meteorological monitoring of air temperature, relative humidity, solar radiation, wind speed and direction every ½ hour at the F. E. Walter Reservoir discharge tower (submitted as a database only);
- Sediment priority pollutant monitoring of PCBs, pesticides, and volatile organics to evaluate sediment toxicity relative to identified screening concentrations;
- Drinking water monitoring to ensure public health safety by comparing water quality from a drinking water source to standards determined by the Safe Drinking Water Act (SDWA); and
- Ambient water temperature was recorded every ½ hour with Onset Computer Corporation TidbiT<sup>™</sup> probes at five stations along the Lehigh River.

### 4.1 WATER QUALITY MONITORING

Water quality monitoring at F. E. Walter Reservoir was not in compliance with the PADEP standard for dissolved oxygen (DO) during July, August, and October at station WA-2. The water quality standard for DO is a minimum concentration of 5 mg/L. Measures of pH were in compliance throughout the monitoring period with the PADEP water quality standard range, the range is from 6 to 9

F. E. Walter Reservoir contained acceptable levels of nutrients during 2004. Measures for total phosphorus were greater than the detection in 100% of the samples. However, the minimum detection limit was equal to the EPA guideline. Ammonia, nitrate + nitrite, TDS, and alkalinity were in compliance with state water quality standards throughout the reservoir watershed.

## **4.2 MONITORING PROGRAM TRENDS**

Trends computed for individual stations using the Mann-Kendall test indicated significant water quality changes at several locations in the F. E. Walter Reservoir drainage. DO was decreasing in the spring and summer at WA-2 and the summer at station WA-5. Ammonia was decreasing at all stations in the summer except at WA-5. Ammonia was also decreasing at WA-3 in the spring. Stations WA-1 and WA-2 had decreasing trends for total nitrogen during the summer. Trends for fecal coliform were increasing during the summer at upstream stations, WA-3, -4 and -5, as well as downstream of the reservoir at station WA-1. Total coliform trends were increasing at WA-4 in the spring and WA-5 in the summer. Trends for total phosphorus, TDS, and BOD were not significant.

## **4.3 TROPHIC STATE CLASSIFICATION**

The trophic status of F.E. Walter Reservoir was defined, independently, by Carlson's trophic state index and EPA criteria. Both classifications were based on concentrations of phosphorus, chlorophyll *a* and secchi disk depths. Carlson's trophic state index classifies the reservoir as mesotrophic/eutrophic in its trophic condition during 2004. However, the EPA criteria classifies F.E. Walter Reservoir as highly variable in its trophic condition during 2004.

## **4.4 COLIFORM BACTERIA MONITORING**

Coliform bacteria contamination at F. E. Walter Reservoir was in compliance with the PADEP water quality standard for bacteria contamination during 2004. The geometric means among samples collected each month were less than 200 colonies/100-ml. Both regression and Mann-Kendall analyses indicated an increasing trend for fecal coliform downstream of the reservoir during summer. The Mann-Kendall also determined an increasing trend upstream on the Lehigh River (WA-3, -4, and -5) for fecal coliform during the summer.

## **4.5 SEDIMENT PRIORITY POLLUTANT MONITORING**

F.E. Walter Reservoir was in compliance with NJDEP soil guidelines in 2004. A total of 62 priority pollutant contaminants comprised of PCBs, pesticides, and volatile organics were assayed in bottom sediments. Of the 62 parameters, only three were identified and none of these exceeded screening levels.

#### **4.6 DRINKING WATER MONITORING**

F. E. Walter Reservoir drinking water was in compliance with PADEP drinking water standards for primary and secondary and bacteria with the exception of pH. Measures of pH were less than the standard range of 6.5 to 8.5.

#### **4.7 TEMPERATURE PROBE MONITORING**

Daily mean temperatures calculated from the data recorded by the TidbiT<sup>™</sup> probes deployed at five Lehigh River monitoring stations were examined and compared to PADEP water use criteria for temperature. The analysis indicated that stations WA1, LH3, and LH10 were not in compliance with temperature requirements for a High Quality Cold Water Fisheries for most of monitoring period. Additionally, stations LH15 and LH17, with several exceptions, in the early summer months, met the PADEP requirements for a Trout Stocking Fishery.

